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1983 FRESH MARKET STAKED TOMATO TRIAL

William M. Brooks, Monica K. Wertz, James D. Utzinger
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1983 FRESH MARKET STAKED TOMATO TRIAL

William M. Brooks, Monica K. Wertz, James D. Utzinger
Eugene C. Wittmeyer and Gerald G. Myers¹

This is another report of a continuing series designed to evaluate currently used and new cultivars of fresh market tomatoes.

Trial Design. Ten cultivars were grown with 3 replications and 49 other cultivars were grown in non-replicated observation plots. Spacing was 48 inches between rows and 18 inches between plants within rows. There were 15 plants per single row plot, equivalent to 7,260 plants per acre. Plants were pruned to the first cluster. Stakes were placed at two plant intervals and metal fence posts were positioned at the ends of each row.

Cultural Practices. Seed was sown on March 30, 1983. Seedlings were transplanted to 48 count cell paks on April 5 and field set on May 27. One thousand pounds/acre 15-15-15 were broadcast and worked in after plowing. Each plant received $\frac{1}{2}$ pint of 10-52-8 starter solution, mixed 3 pounds per 50 gallons of water, at time of field planting. Seventy-five pounds/acre ammonium nitrate was sidedressed as needed. Weed control consisted of Treflan at 1 pound ai/acre preplant incorporated and Sencor at 1/4 pound ai/acre after the plants were well established. Irrigation was applied at a rate of 1" per week as needed.

Weather Data. University Farm Weather Station - Columbus.

<u>Month</u>	<u>Mean Temperature (°F)</u>			<u>Precipitation</u>	
	<u>Max.</u>	<u>Min.</u>	<u>Avg.</u>	<u>Rain(inches)</u>	<u>Deviation from Normal</u>
May	69.5	45.8	57.7	6.75	+2.23
June	81.3	58.2	69.8	3.03	-0.97
July	88.6	65.0	76.8	2.01	-2.10
August	89.7	62.5	76.1	2.81	-0.77
September	81.3	51.9	66.6	2.95	-0.02
October	66.5	43.1	54.8	3.55	+1.40

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1. Mailing address: Department of Horticulture, The Ohio State University, 2001 Fyffe Court, Columbus, Ohio 43210.

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Participating Seed Companies.

Code

A-1	Abbott & Cobb, Inc., P.O. Box 307, Feasterville, PA 19047
A-2	Asgrow Seed Co., Kalamazoo, MI 49003
B-1	George J. Ball, Inc., West Chicago, IL 60185
C-1	A. L. Castle, Inc., P.O. Box 877, Morgan Hill, CA 95037
F-1	Ferry-Morse Seed Co., San Juan Bautista, CA 95045
F-2	University of Florida - Agricultural Research and Education Center, Bradenton, 5007 60th Street East, Bradenton, FL 33508 (Dr. Jay Scott)
H-1	Joseph Harris Co., Rochester, NY 14624
L-1	Lethermans Seed Co., Canton, OH 44707
M-1	Moran Seeds, Inc., Davis Research Center, P.O. Box 2508, El Macero, CA 95618
P-1	Peto Seed Co., Inc., Box 4206, Saticoy, CA 93003
S-1	Siegers Seed Co., 7245 Imlay City Road, Imlay City, MI 48444
S-2	Stokes Seeds, Inc., 737 Main St., Box 548, Buffalo, NY 14240

Results and Discussion

The first harvest was made on July 25 and the last on October 19. The early part of the growing season was extremely wet this year, followed by three months of below average rainfall. This is reflected in the overall low early marketable yields, and in the high percentage of culls early (averaging 25% vs. 5% in previous years), most of which were fruit with blossom-end rot. The crop finished off relatively well, with improved environmental conditions later in the season. Plot location had a negative effect also on yield since the soil in this area was very compacted. This especially affected the front section of the field where the 1st two reps of the replicated trial were located. The staking procedure was improved over last year and worked very well. It is questionable as to what effect, if any, smaller transplant size had on early and total yields. Transplants this year were grown in 48 count cell pak trays; 32 count trays were used in previous trials.

Results of the replicated trial are in Table 1. President was the best yielding cultivar, both early and total marketable, and had an above average fruit size. Freedom had the second highest marketable yield, early and for the season, and had the largest fruit size for the season. It must be kept in mind, as mentioned previously, that early marketable yields were lower this year, and percentage of culls early was higher. Jet Star and Better Boy had the fewest number of blossom-end rot problems early.

In the observation trial (Table 2), Vegas (FM-X70) was the best early marketable yielding line in addition to possessing good fruit size. It also did well for the total season. Burgis had the highest total marketable yield of any cultivar in both the replicated and observation trials. Independence was consistently good; Liberty also had good yield, but was smaller-fruited. Other promising cultivars included HXP 2792, Celebrity, and Bingo (FM-X45).

Disease Resistance, Fruit Quality, and Plant Habit. Disease resistances as noted by the seed companies for all cultivars tested are listed in Table 3. Fruit quality ratings taken at harvest time include internal appearance (based on color and wall thickness), green shoulder, and fruit defects including radial and concentric cracking, catfacing, zippering, and blotchy ripening. Plant habit classifications, where supplied by seed company, are noted in the final column. The cultivars in Table 3 are listed in the same order as they appear in Tables 1 and 2.

Taste Panel. A tomato taste panel was conducted for the first time this year on 20 selected cultivars from both the replicated and observations. The results of this panel are listed in Table 4. Taste and texture were evaluated by a 10 person panel at peak harvest time. The rating scale ranged from very good (5 points) to very poor (1 point). A tally of total points was then taken. Cultivars are ranked in the table according to decreasing number of points for taste: Starpak, Freedom, Early Set, 7065-VSBK, Jackpot, and President all ranked high. This information, along with the information in Table 3, is provided in order to further assist the grower in evaluating any potentially good yielding cultivars.

Table 1. Replicated Staked Trial: Yield, Grade, and Fruit Size of Tomato Cultivars, Columbus, Ohio, 1983

Table 1. Repeated Staked Trial: Yield, Grade, and Fruit Size of Tomato Cultivars, Columbia, Ohio, 1966											
Cultivar*	Seed Source	Early Harvest to August 9					Total Harvest to October 19				
		Marketable Yield		Percent		Fruit Size (oz.)	Marketable Yield		Percent		Fruit Size (oz.)
		(Tons/Acre)		by Weight			(Tons/Acre)		By Weight		
		No. 1	Total	No. 1	Culls		No. 1	Total	No. 1	Culls	
President	P-1	3.23	3.61	72	20	5.61	27.14	35.38	71	8	5.17
Freedom	A-1	2.18	2.88	65	14	5.63	23.05	33.25	64	8	6.12
Fresh Pak	H-1	1.84	2.18	64	23	5.00	15.83	23.40	62	8	5.31
Jet Star	H-1	1.45	1.62	87	2	4.84	19.46	26.18	68	9	4.03
Better Boy	B-1	1.42	1.59	83	7	6.05	21.40	32.67	62	5	5.36
Star Pak	H-1	1.39	2.13	48	27	3.75	17.49	23.47	67	10	4.29
Count Fleet (FMX-46)	F-1	1.33	1.45	69	24	5.74	20.38	30.81	61	8	5.25
Royal Flush	F-1	0.72	0.73	46	54	5.24	14.64	19.55	61	18	5.03
Castlehy 1041	C-1	0.37	0.58	35	45	5.00	20.37	26.55	70	12	4.84
Hayslip	F-2	0.33	0.39	53	38	3.26	21.76	34.46	58	8	5.20
LSD 5%		1.87	1.98			1.44	NSD	NSD			0.72

*Cultivars ranked in decreasing order of early yield of U.S. No. 1 grade fruits. Data based on mean of 3 replications.

Table 2. Observation Staked Trial: Yield, Grade, and Fruit Size of Tomato Cultivars, Columbus, Ohio, 1983

Cultivar*	Seed Source	Early Harvest to August 9					Total Harvest to October 19				
		Marketable Yield		Percent		Fruit Size (oz.)	Marketable Yield		Percent		Fruit Size (oz.)
		(Tons/Acre)		by Weight			(Tons/Acre)		By Weight		
		No. 1	Total	No. 1	Culls		No. 1	Total	No. 1	Culls	
Vegas (FM-X70)	F-1	3.10	3.29	92	2	7.25	33.18	49.20	67	4	5.26
Pik Red	H-1	3.05	3.85	77	3	6.52	22.99	28.04	76	7	6.02
Independence	A-1	2.56	3.10	60	28	4.65	40.46	52.18	73	6	5.35
HXP 2792	H-1	2.44	3.24	74	2	5.64	35.86	46.00	76	2	5.48
Celebrity	P-1	2.40	2.63	80	12	6.01	32.04	43.72	69	6	4.71
Liberty	A-1	2.23	2.30	95	2	4.61	40.61	53.99	71	5	4.24
PSX 38179	P-1	2.15	2.71	72	9	5.27	21.39	30.12	52	27	4.99
Basket Vee	S-2	2.08	2.95	64	9	3.42	27.32	33.78	77	5	4.31
Burgis	F-2	1.91	2.01	91	5	5.11	44.81	58.41	74	4	5.25
PSX 31877	P-1	1.79	2.06	58	29	5.67	14.42	19.02	70	8	5.05
Contessa	P-1	1.67	1.69	82	17	4.87	27.95	39.13	62	13	3.85
Count II	P-1	1.62	2.11	74	4	3.76	35.84	46.46	75	3	4.05
Duke	P-1	1.60	2.20	69	5	4.85	35.28	42.96	78	6	4.87
Winners Circle (FM-X59)	F-1	1.55	1.57	84	14	6.50	30.95	40.87	68	11	5.34
HXP 2790	H-1	1.47	2.08	66	7	4.68	30.76	40.44	74	3	5.15
SSX 86621	S-1	1.45	1.91	75	1	5.27	24.97	35.13	67	6	5.58
FM2CR2	H-1	1.30	1.37	81	15	5.36	28.85	40.03	68	5	5.01
Pole King	A-1	1.28	1.36	85	10	5.27	37.34	47.72	74	6	5.20
SSX 86620	S-1	1.21	1.62	70	6	5.36	27.64	39.37	67	4	5.34
Bingo (FM-X45)	F-1	1.09	1.11	92	6	6.69	41.43	55.80	70	6	5.36
Jackpot	F-1	0.99	1.57	34	46	4.33	17.40	21.95	69	13	4.95
Blazer	M-1	0.97	1.55	29	54	5.69	23.72	29.94	67	16	4.61
Sunny LCII	A-2	0.92	1.16	79	0	4.04	34.73	44.96	75	3	4.69
ACX-824151	A-1	0.89	1.72	51	3	4.94	18.39	28.99	57	10	5.22
Count II	A-1	0.89	0.99	64	29	4.37	32.11	41.67	74	5	4.76
Stokes Pak VFN	S-2	0.82	1.72	15	69	3.79	14.20	25.87	43	22	3.39
PSX 879	P-1	0.82	1.48	34	38	2.87	14.30	23.08	50	20	3.80
7045-EBK	F-2	0.80	0.85	97	3	6.22	24.37	39.30	57	9	4.82
Early Set	H-1	0.77	1.62	39	19	2.82	23.16	38.50	53	12	3.00
PSR 38679	P-1	0.63	0.85	47	36	5.60	28.24	35.26	74	8	5.08
Liberator	F-1	0.63	0.73	87	0	4.80	33.61	47.52	64	9	4.99
Sunray	H-1	0.61	0.63	83	13	5.94	22.48	30.37	71	4	4.57
Duchess	P-1	0.61	0.63	27	72	5.20	31.27	37.92	68	17	5.04

Table 2. Observation Staked Trial: Yield, Grade, and Fruit Size of Tomato Cultivars, Columbus, Ohio, 1983 (Continued)

Cultivar*	Seed Source	Early Harvest to August 9					Total Harvest to October 19				
		Marketable Yield		Percent		Fruit Size (oz.)	Marketable Yield		Percent		Fruit Size (oz.)
		(Tons/Acre)		by Weight			(Tons/Acre)		By Weight		
		No. 1	Total	No. 1	Culls		No. 1	Total	No. 1	Culls	
Lucky Draw (FM-X55A)	F-1	0.46	0.51	36	60	4.20	28.87	40.56	54	24	4.62
HXP 2791	H-1	0.44	0.48	86	5	3.56	30.35	39.37	71	8	4.76
PSR 879	P-1	0.39	0.58	43	35	3.49	27.01	38.45	66	6	3.58
Castlehy 105	C-1	0.39	0.39	100	0	5.12	26.31	40.37	63	4	4.58
Castle 7C773	C-1	0.34	0.39	64	27	5.12	36.28	48.18	72	5	5.09
Hybrid #980	L-1	0.32	0.87	33	8	7.20	33.90	44.67	73	4	4.41
Beefsteak Plus VF	L-1	0.29	0.29	71	29	6.40	20.86	28.24	70	5	5.16
Florida 1B	F-2	0.19	0.27	73	0	3.52	18.71	26.49	68	3	5.34
7065-VSBK	F-2	0.15	0.29	9	82	2.74	19.12	25.87	66	10	5.14
Castle 7C774	C-1	0.07	0.07	43	57	4.80	32.48	40.68	78	2	4.81
MOX 3081	M-1	0.05	0.19	9	65	3.20	26.98	36.25	68	9	3.87
Mountain Pride	P-1	0.04	0.10	50	0	2.13	35.19	47.45	73	2	4.32
Castlehy 1075	C-1	0.0	0.02	0	80	1.60	36.13	45.39	75	6	4.36
Castle 7C775	C-1	0.0	0.02	0	50	1.60	24.68	35.77	66	5	4.34
Atlantic City (FM-X58)	F-1	0.0	0.02	0	99	1.60	21.92	28.53	58	25	4.15

*Cultivars ranked in decreasing order of early yield of U.S. No. 1 grade fruits.

Table 3. Fruit Disease Resistance¹, Fruit Quality Ratings², and Plant Habit³ For Staked Trial Cultivars.

Cultivar ⁴	Disease Resistance	Persistent Green Shoulder ⁵	Concentric Cracking	Radial Cracking	Catface or Stylar Scar	Zippering	Blotchy or Uneven Ripening	Core Size	Internal Appearance ⁶	Plant Habit
<u>Replicated Staked:</u>										
President	AF1&2NSTV	4	4	4	5	5	3.5	4	4.5	Det.
Freedom	F1&2V	4	4	4	4.5	5	4.5	3.5	4	Det.
Fresh Pak	F1NV	4	4	4	5	5	4.5	4.5	5	Det.
Jet Star	F1V	4	4	4.5	5	5	4.5	3.5	4	Inde.
Better Boy	F1NV	4	3.5	4.5	5	5	4.5	3.5	4	Inde.
Star Pak	F1&2V	-	5	4.5	5	5	5	3.5	4	Inde.
Count Fleet (FM-X46)	AF1&2NTV	3	3	3.5	5	5	2.5	3.5	3.5	Semi-Det.
Royal Flush	F1NV	4	3.5	4	5	5	5	5	4	Det.
Castlehy 1041	F1&2	5	5	4.5	5	5	4.5	5	5	Det.
Hayslip	F1&2SV	4	4	4	5	4	4.5	5	4.5	Semi-Det.
<u>Observation Staked:</u>										
Vegas (FM-X70)	AF1&2V	3	3.5	4	5	5	3.5	3	3	
Pik Red	F1&2V	4	4	4	5	5	5	4	4	Det.
Independence	F1&2V	4	4	4.5	5	5	5	4	4	Det.
HXP 2792	F1&2V	4	3.5	4	5	4	5	4	3.5	
Celebrity	F1&2NTV	5	4.5	4.5	5	5	5	4.5	4	Det.
Liberty	F1&2V	5	4.5	4.5	5	5	5	3.5	4	Det.
PSX 38179	AF1&2NSTV	5	4.5	3.5	5	5	5	3	4	
Basket Vee	F1V	-	4.5	4.5	5	5	2	2.5	2	Det.
Burgis	F1&2SV	-	4	4	5	5	4	4	4	Semi-Det.
PSX 31877		3	4	3.5	5	5	3.5	3.5	3.5	
Contessa	AF1&2NS	5	5	4.5	5	5	4.5	3	3.5	Det.
Count II (Peto)	AF1&2V	4.5	4.5	4.5	5	5	5	4	3.5	Det.
Duke	AF1&2SV	4	4.5	3.5	5	5	4.5	4.5	4.5	Semi-Det.
Winners Circle (FM-X59)	AF1&2V	-	3.5	4	5	5	3.5	4	4	Semi-Det.
HXP 2790	F1&2V	3	4	3	5	5	4.5	4.5	4	
SSX 86621	F1&2V	4	4	3.5	5	5	3	3	3	
FM2CRZ	F1V	-	4.5	4.5	5	5	5	4	4	Inde.
Pole King	F1&2V	5	4.5	4.5	4	5	3.5	3	3	Inde.
SSX 86620	F1&2V	-	4.5	3.5	5	5	4	3	3.5	
Bingo (FM-X45)	AF1&2TV	-	3	4.5	5	5	4.5	4	4.5	Semi-Det.
Jackpot	AF1&2NSV	3	3.5	4	5	5	4.5	3	3.5	Det.

Table 3. Fruit Disease Resistance¹, Fruit Quality Ratings², and Plant Habit³ For Staked Trial Cultivars (Continued).

Cultivar ⁴	Disease Resistance	Persistent Green Shoulder ⁵	Concentric Cracking	Radial Cracking	Catface or Stylar Scar	Zippering	Blotchy or Uneven Ripening	Core Size	Internal Appearance ⁶	Plant Habit
Observation Staked: (Continued)										
Blazer	AF _{1&2} V	-	5	4.5	5	4	4.5	4	4	Det.
Sunny LCII	AF _{1&2} SV ₁	3	3.5	3.5	5	5	3	2.5	2.5	Det.
ACX-824151		5	4	4.5	5	5	5	4.5	4.5	Inde.
Count II (Abbott & Cob)	AF _{1&2} V	2.5	3.5	3.5	5	5	3	4	3.5	Det.
Stokes Pak VFN	F _{1&2} NV	-	4.5	4.5	4.5	5	5	3	3	Det.
PSX 879		4	3	3	5	5	4	4	4	
7045-EBK	F _{1&2} SV	2.5	4	4	5	5	3	4	4	Det.-Semi-Det.
Early Set	AF _{1&2} NTV	-	3.5	5	4	5	5	3	3.5	Inde.
PSR 38679	AF _{1&2} NSTV	4	4	4	5	4	4.5	2	3	
Liberator		3.5	4	4	5	5	3	4	4.5	
Sunray	F ₁	5	4.5	4.5	5	5	5	4	4.5	Det.
Duchess	AF _{1&2} NSV	4.5	4.5	4.5	5	5	5	4.5	4.5	
Lucky Draw (FM-55A)	AF _{1&2} V	3	4	4	5	3.5	3	3.5	3.5	Semi-Det.
HXP 2791	F _{1&2} V	4	4.5	4.5	5	4.5	5	4	4	
PSR 879	AF _{1&2} SV	3	4	3.5	5	5	4	2	3	
Castlehy 105	F _{1&2} SV	4	4	4	5	5	4.5	3.5	4	Inde.
Castle 7C773	F ₁ NTV	5	4.5	4.5	5	5	5	2	2.5	
Hybrid #980	F ₁ V	3.5	4.5	4.5	5	5	5	2.5	3	Semi-Det.
Beefsteak Plus VF	F ₁ V	-	4	4	5	5	5	3.5	3.5	
Florida 1B	F _{1&2} SV	4	4.5	4.5	5	4	3.5	5	4.5	Det.
7065-VSBK	F _{1&2} SV	-	5	5	5	5	4.5	4.5	4.5	Semi-Det.
Castle 7C774	F ₁ NTV	4	4.5	4.5	5	5	5	4	4	
MOX 3081		2.5	4.5	4	5	4.5	5	4	4	
Mountain Pride	AF _{1&2} SV	-	4.5	4.5	5	5	5	3.5	4	Det.
Castlehy 1075	F ₁ NTV	-	4	4	5	5	4.5	4	4	
Castle 7C775	F ₁ V	4	4.5	4.5	5	5	4.5	3	3.5	
Atlantic City (FM-X58)	AF _{1&2} SV	4	5	4.5	5	4	3.5	4	4	

¹Disease Resistance Codes: A = Alternaria Stem Canker, C = Cladosporium Leaf Mold, F₁ = Fusarium Wilt (race 1), F₂ = Fusarium Wilt (race 2), N = Root Knot Nematode, S = Stemphyllium (gray leaf spot), T = TMV, V = Verticillium

²Quality Ratings for all variables were made on a 1 to 5 scale where 5 indicates no problem and 1 is a severe problem.

³Plant Habit Abbreviations: Inde. = Indeterminate, Det. = Determinate, Semi-Det. = Semi-Determinate; noted where information was supplied.

⁴Cultivars are in the order they appear in Tables 1 and 2. ⁵No rating means the cultivar has the uniform ripening gene (no dark green shoulder).

⁶Internal appearance is based on internal color, and wall thickness.

Table 4. Tomato Taste Panel Results

<u>Cultivar</u> ¹	<u>Total Number of Points</u> ²	
	<u>Taste</u>	<u>Texture</u>
Star Pak	42	42
Freedom	39	39
Early Set	37	37
7065-VSBK	36	41
Jackpot	35	40
President	35	40
Count Fleet (FM-X46	35	25
Liberty	35	25
Pik Red	32	38
Better Boy	30	35
Count II	30	35
Duke	30	30
Royal Flush	30	28
Hayslip	29	34
Celebrity	39	33
7045-EBK	28	35
Pole King	28	32
Fresh Pak	28	25
Castlehy 1041	25	29
Jet Star	25	25

¹Cultivars ranked in decreasing order of total number of points for taste.

²Rating Scale: 5 points = very good 4 points = good
 3 points = acceptable 2 points = poor
 1 point = very poor

Total number of points = addition of points collected from a 10 person panel where maximum number of points = 50 and minimum number of points = 10.

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